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Standard ECG, Stress Testing

BODY MASS INDEX AND BLOOD PRESSURE IN CHILDREN: NOVEL ELECTROCARDIOGRAPHIC VALUES THAT CORRELATE WITH ECHOCARDIOGRAPHIC LEFT VENTRICULAR GEOMETRY AND MASS IN OBESE CHILDREN

Moderated Poster Contributions
Hall C
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Authors: *Victoria L. Vetter, Darius J. McDaniel, Noreen Dugan, Danielle Haley, Lauren Cosgriff, Justine Shults, The Children's Hospital of Philadelphia, Philadelphia, PA, USA, Perelman School of Medicine at the University of Pennsylvania, Philadelphia, PA, USA*

Background: The prevalence of obesity in United States children is 17%, and of hypertension (HT) is 2-5%. Cardiac sequelae of obesity and hypertension manifest as left ventricular hypertrophy (LVH) on the electrocardiogram (ECG) or echocardiogram (ECHO).Current pediatric ECG standards for LVH primarily use R wave amplitude in V6.

Methods: We describe correlations of body mass index (BMI) and blood pressure with novel computer-derived ECG LVH values in lead V6, (R amplitude, R amplitude-duration, QRS area); and with LVH ECHO measurements (LV mass, LV diastolic dimension, septal and LV wall thickness). We aim to identify ECG abnormalities associated with childhood obesity and HT that might predict early cardiac effects later associated with adult onset cardiac disease, and to identify differences by race, age, and sex. A multivariable logistic regression model was used to evaluate associations with obesity and hypertension. We evaluated 400 healthy 5- to 19-year-olds with history, blood pressure, BMI, cardiac exam, ECG, and ECHO.

Results: Subjects were 11.8 ± 3.9 years, 53% male, 87% Caucasian, 9.7% Black, 2.3% Asian, 1% (>1 race) and 1% Hispanic. The BMI median percentile was 63%. Obesity (BMI ≥95th %tile) occurred in 40 (10%) subjects. Overweight (BMI 85th- 94th %tile) was present in 61(15.3%) for a total of overweight/obesity of 25.3%. Of the 40 subjects with obesity, 8 (20%) had HT (≥95th %tile), while the 299 subjects without obesity/overweight, 7 (2.34%) had HT ($p<0.0001$). ECG V6 amplitude-duration and V6 QRS area significantly correlated with all ECHO measurements of LVH, including LV mass ($p<0.0001$), but V6 R amplitude, the currently used indicator of LVH on ECG, did not. All ECHO measures of LVH correlated with BMI ($p<0.0001$). BMI correlated with blood pressure ($p=0.0001$). In the multivariable logistic regression model, being Black associated with obesity (Odds Ratio 3.73) $p<0.002$; being Black (Odds Ratio 4.0) and older-15-19 yrs (Odds Ratio 5.5) $p=0.02$ associated with HT. Sex did not correlate with either.

Conclusions: Race and age-related differences in obesity and HT are present in children. Novel ECG values can help better identify those most likely to have ECHO measurements of LVH.